

Committee on Earth Observation Satellites
17th Plenary Meeting
Colorado Springs, Colorado
November 19-20, 2003

CEOS/17/Agency Report:
SNSB

Item 19.4

Swedish National Space Board Report

SUMMARY AND PURPOSE

Herewith the Swedish National Space Board provides a status update on the Odin program.

ACTION PROPOSED

The meeting is invited to take note of the information contained in this document.

15 October 2003

Odin status report

Odin is an aeronomy/astronomy satellite project in orbit since 20 February 2001. The spacecraft was launched into a near-polar, sun-synchronous, terminator orbit at 620 km (presently 590 km) with its ascending node at 18:00 hours. The nominal life time of Odin was estimated to 2 years, but more than 2,5 years into the mission there are no signs of deterioration in the performance of the instruments and the fully redundant spacecraft is still operating on its primary systems. In view of the technical performance and excellent scientific results the partner agencies have agreed to fund the operations until the end of April 2004 and are considering the funding of a forth year.

The aeronomy part of the mission is optimized for addressing questions related to four general topics: (1) stratospheric chemistry, (2) ozone abundance in the mesosphere, (3) abundance of water vapour and aerosols in the summertime, polar mesosphere and (4) stratospheric and mesospheric dynamics. Scattered emission from aerosols and line emission from key molecules will be used for these studies. Key molecules are ClO, H₂O, NO, N₂O, NO₂, NO₃, O₃, CO, HNO, HNO₃, OCIO and BrO.

In the aeronomy mode the satellite is scanning the Earth's limb around 60 times per orbit. The scans fall in the range from 6 to 100 km altitude, to some extent depending on the scientific programme carried out. The reconstructed altitude knowledge is approximately 2 km.

The main instrument on Odin, used for both the atmospheric and astronomical studies, is a 1.1 metre, offset Gregorian telescope feeding a 5 channel radio meter, based on cooled (120 K), single sideband Schottky mixers. Four submm receivers are tunable and cover the frequency ranges 486-504 GHz and 541-581 GHz. The fifth receiver is fixed-tuned and covers the frequency range 118.25-119.25 GHz.

The atmospheric studies are complemented by UV/vis/NIR measurements, using an imaging, grating spectrometer operating in the wavelength range 280-800 nm at a spectral resolution of 1-2 nm and an imaging photometer having three 10 nm wide, contiguous spectral bands centered at 1270 nm. The optical axes of both the grating spectrometer and the photometer are co-aligned with that of the radiometer.

Odin's dedicated Control Centre is located at Esrange, some 42 km outside Kiruna in the north of Sweden. From that latitude, 68°N, the Odin satellite is visible 10 to 11 times a day, from 2:30 to 18:45 UTC. Total pass duration is approximately 80 min per day.

The Odin programme is based on inputs from the Odin aeronomy scientists and decided by the Odin Science Team, common for both astronomy and aeronomy. The Odin data are presently used for various process studies, exploiting e.g. Odin's unique capability to measure accurate water vapour profiles up to high altitudes. Recent studies have also addressed the chemistry associated with the split of the stratospheric polar vortex over Antarctica in September 2002. At this time Odin was the only satellite able to measure chlorine monoxide (ClO), a key constituent responsible for the so-called "ozone hole".

Odin is a collaborative satellite project involving Sweden, Canada, Finland and France. The project is managed by the Swedish Space Corporation on behalf of the Swedish National Space Board and its partner agencies.